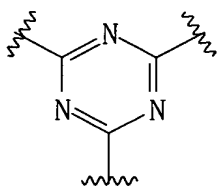


## Polymer Electrolyte Membranes Crosslinked by Nitrile Trimerization

### Abstract

A method is provided for making a crosslinked polymer electrolyte, typically in the form of a membrane for use as a polymer electrolyte membrane in an electrolytic cell such as a fuel cell, by trimerization of nitrile groups contained on groups pendant from the polymer. The resulting polymer electrolyte membrane comprises a highly fluorinated polymer comprising: a perfluorinated backbone, first pendent groups which comprise sulfonic acid groups, and crosslinks comprising trivalent groups according to the formula:



( I ).

The first pendent groups are typically according to the formula:  $-R^1-SO_3H$ , where  $R^1$  is a branched or unbranched perfluoroalkyl or perfluoroether group comprising 1-15 carbon atoms and 0-4 oxygen atoms, most typically  $-O-CF_2-CF_2-CF_2-CF_2-SO_3H$  or  $-O-CF_2-CF(CF_3)-O-CF_2-CF_2-SO_3H$ .